Physiological Monitoring Device

Project Motivation:

We chose this project as it provides an opportunity to design products that assist those within the epliletptic community. Many engineering products that do physiological monitoring are catered towards athletes in an attempt to improve their physical abilities. None of these devices are engineered and catered to specifically monitor those with epilepsy in both an accurate and discrete manner. We specifically chose to monitor those with epilepsy as in the UK alone there are 600,000 people with this neurological disorder, that's nearly 1% of the entire UK population. 70% of these are children who experience silent seizures, often also with no movement, preventing them from being able to use standard seizure detection alarms which are based on these symptoms. In essence, these people lack a solid engineering device that can accurately track their physiological symptoms and detect seizures that could then notify proper caretakers. At the moment, no notable engineering company offers these services within a compact product catered towards these individuals, even though one in the industry is desperately needed.

Epilepsy is a neurological disorder caused by the excessive and abnormal neuronal activity. These excessive, abnormal brain activity results in seizures. If these seizures occur while the individual is unsupervised, they can be serious to the individual while they are convulsing. Furthermore, certain types of seizures can last for prolonged periods of time which can be life threatening. With an early notification system, we can help to mitigate the length of the seizure and receive medical attention earlier. Our device will be monitoring three physiological factors: heart rate, muscle tension, and perspiration. Studies have proven there are certain early indicators or warnings of seizures such as increased heart rate and perspiration.

Project Requirements:

1. Bluetooth Wristband device.
2. Electronic tablet to receive the information from the wristband.
3. The tablet needs to be able to convert the data from the wristband to readable data to others.
4. When all the sensory data are outside the set threshold, the device must send a notification to alert the user to confirm if the alert was due to physical exercise, regular activities, etc. If the user does not confirm within a given time, a SOS alert will be sent out to caretakers. If the user does confirm the alert, then a SOS alert will not be sent.
5. Wristband must have adequate battery life and adjustable straps.
6. Wristband must be able to read the heart rate, muscle tension, and perspiration on the user.

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Sketch:

Wristband

temperature sensor

heart rate sensor

muscle contraction sensor

prespiration sensor

T   MC

HR   P

Heart Rate Measurements

Muscle Contractions

Temperature Measurements

Prespiration Measurements

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